AMENDMENT TO THE CLAIMS

1. (Original) A detection system for detecting, locating and classifying an object selected from the group of magnetic and conducting objects, the detection system adapted to detect a secondary magnetic field generated by the object in response to a primary magnetic field transmitted by the detection system, the detection system including an active subsystem for generating an alternating current magnetic field of simultaneous multiple frequencies and a synchronous detection subsystem for accurately measuring the amplitude and phase of the secondary magnetic field.

2. (Original) A system according to claim 1 in which the synchronous detection subsystem includes a plurality of sensors, and the active subsystem is adapted to shape the transmitted field in the vicinity of the sensors in order to reduce the sensors' sensitivity to the transmitted field and to desensitize the sensors to movement with respect to the active subsystem.

3. (New) Apparatus for determining presence of an object, comprising:

a. an emitter adapted to produce and propagate a time varying primary electromagnetic field;

b. at least one sensor, the sensor adapted to receive a secondary electromagnetic field, the secondary electromagnetic field produced by the object as a function of the primary electromagnetic field;

c. the sensor coupled to a receiver, the receiver adapted to determine differences in phase between the primary electromagnetic field and the secondary electromagnetic field and to provide information corresponding to identification of the material forming the object as a function of said phase differences.

4. (New) Apparatus according to claim 3 in which the at least one sensor is adapted to determine amplitude of the secondary electromagnetic field and to provide information corresponding to distance of the object to the at least one sensor.

5. (New) Apparatus according to claim 4 in which the at least one sensor is adapted to sense gradients in the secondary electromagnetic field.

6. (New) Apparatus according to claim 3 comprising at least two sensors, the sensors further adapted to sense amplitude and gradients in the secondary electromagnetic field, the sensors further adapted to provide information relating to direction and distance of said object from at least one of said sensors.

7. (New) Apparatus according to claim 3 in which the at least one sensor is adapted to provide information corresponding to identification of material forming the object based at least in part on determining from said phase differences information relating to conductivity and permeability of said material.

8. (New) Apparatus according to claim 3 in which the emitter is adapted to emit, and the at least one sensor is adapted to sense, a plurality of primary electromagnetic fields, at least some of said fields varying in at least one property from other of said fields.

9. (New) Apparatus according to claim 3 in which the at least one sensor determines said phase differences using a clock that is also used by the emitter.

10. (New) Apparatus according to claim 3 in which the primary electromagnetic field contains at least one code and the at least one sensor uses the code of said primary electromagnetic field to determine said phase differences.

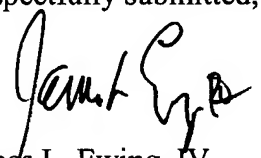
11. (New) Apparatus according to claim 3 in which the emitter is adapted to pulse width modulate the primary electromagnetic field.

12. (New) Apparatus according to claim 3 in which the emitter uses switched capacitors in order to pulse width modulate the primary electromagnetic field.

13. (New) Apparatus according to claim 3 in which the emitter includes a resonant power circuit in order to produce the primary electromagnetic field.

14. (New) Apparatus according to claim 3 further comprising at least one nulling emitter adapted to produce and propogate a nulling electromagnetic field in order to reduce effects of the primary electromagnetic field on said at least one sensor.

Respectfully submitted,



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